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BOTANY.

The Plants of the Bahamas, Jamaica, and Grand Cayman.—Professor A. S. Hitchcock's paper on this subject, which appeared in the Fourth Annual Report of the Missouri Botanical Garden, is very interesting, inasmuch as it not only catalogues a large number of species, but in addition discusses at some length some of the problems connected with insular floras. The following are some of the author's conclusions.

"It would seem to the writer that the ordinary methods of dissemination would account for the flora of the Bahama Islands without calling in the aid of hypotheses founded on ancient land connection. There are probably no more endemic species than would be found if all the islands were at present connected. It seems hardly reasonable to suppose that Watling's, Crooked Island or Inagua have ever been connected with Cuba or any of the other islands, yet the flora of these have about the same relation to Cuba as do the islands of the Bahama bank. From the table it will be seen that the flora comes from the south, that it is essentially Cuban and that this flora has also established itself in the extreme southern part of Florida, where it is found only on the most recent formations. Climatic conditions undoubtedly prevent any great extension to the north, but most of the plants would probably extend further north than they do, were they not brought into competition with an established flora. On the other hand very few plants from the Southern States have found their way to the Bahamas, and those that have are mostly such as are of wide distribution in the Tropics and hence just as probably came from the south as from Florida.

"Again, the facilities for distribution, the ocean currents and the prevailing winds, are from the south to the north. The Gulf Stream not only tends to bring plants from the south but quite effectually prevents any from drifting from Florida to the Bahamas. The current is so strong that the occasional northers would be more than counteracted, while the easterly winds are favored. What is true of the Gulf Stream to the west of the Bahamas is also true of the Equatorial Current to the east. Distribution by birds is apparently of little importance or we should find more plants with pulpy fruits brought from Florida. Maritime plants are easily distributed by currents as their seeds are not injured by the salt water, and furthermore, as stated by Hemsley and Wallace, when cast ashore they find a suitable place for germination, while many other seeds although transported fail to be placed in a favorable situation. I collected several beans of *Gigalobium scandens* on various beaches, but the plant had not gained a foot-hold as its habitat is the dense woods of the larger islands. But the bulk of the flora of the Bahamas is either maritime or such as would, under favorable conditions, be likely to pass through the salt water ordeal successfully. The islands are all low and probably most of the species are found within the influence of the sea."

The Saprolegniaceæ of the United States.—The monograph of the Saprolegniaceæ of the United States, prepared by Dr. J. E. Humphrey, and published by the American Philosophical Society, is a notable contribution to the botany of the lower plants. It occupies eighty-six quarto pages of text, and is illustrated by seven large plates. The author first discusses the group in general, giving much attention to the non-sexual and sexual reproduction, and bringing out many interesting facts. He confirms the statement of DeBary and others that the so-called sexual reproductive organs are morphologically sexual, though not physiologically so in all cases.

The second part of the paper is occupied with descriptions of the genera and species. Seven genera are known to occur within our limits, viz: *Saprolegnia*, with seven species; *Pythiopsis*, with one species; *Achlya*, with eight species; *Aphanomyces*, with two species; *Dictyuchus*, with one species; *Leptomitus*, with one species; *Apodachlya*, with one species. A number of other species are described, of which as yet no specimens have been found in the United States. A bibliography of 110 titles is given, of which but five are by American authors. The plates add much to the usefulness of the paper, and should make the study of these much less difficult than heretofore.

Dr. Humphrey recommends the following method of cultivating these plants. "The most prolific source of supply is water containing green algæ, and the best subsistance is afforded by insects, such as common house-flies or meal-worms. For material, a handful of algæ may be taken from the stream, pond or pool in which they are growing and placed in a collecting bottle or other vessel, which will protect them from drying. In the laboratory, these are placed in a vessel of water from the public or private water supply, and the culture insects are thrown upon its surface. This collection of a mass of algæ without water, except that retained by the mass, reduces the bulk of specimens, which is of importance when they are taken at a distance from the laboratory, and largely excludes aquatic organisms which might make trouble in the cultures; while experience shows that the zoöspores and oöspores of the *Saprolegniaceæ* are carried with the algæ to a large extent. * * * The insects used may be freshly killed, and their chitonous covering should be broken as little as possible; but I have found that for winter cultures, when fresh insects are not readily available, an excellent substitute may be found in dead house-flies, collected in the fall and kept dry and exposed to the air, but protected from dust. Since the dry surfaces of insects are not readily wetted by water, it has proved useful to moisten them, whether fresh or dried, with alcohol, and then soak them in water for a few minutes to remove the alcohol. They will then, when thrown into the culture vessel, sink until their bodies are mostly below the surface, and so present a much larger area to the swimming zoöspores of *Saprolegniaceæ* than if dry and floating largely above the surface."

The publication of this paper will certainly stimulate the more general study of these interesting aquatic fungi.

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